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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/690,801	10/22/2003	Stuart S. Goldstein	P2002J095 (US2)	5620

7590 04/14/2008  
ExxonMobil Research and Engineering Company  
P.O. Box 900  
Annandale, NJ 08801-0900

EXAMINER
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SINGH, PREM C

ART UNIT	PAPER NUMBER
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1797

MAIL DATE	DELIVERY MODE
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04/14/2008

PAPER

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/690,801  
Filing Date: October 22, 2003  
Appellant(s): GOLDSTEIN ET AL.

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Malcolm D. Keen  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 03/11/2008 appealing from the Office action mailed 09/10/2007.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

No amendment after final has been filed.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

Conversion of Fixed Bed Reformers to UOP CCR Platforming Technology,

01/01/1989                      Golem et al.

US 5,854,162                      12/29/1998                      Dufresne et al.

### **(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-4, 6-8, and 10-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Golem et al. ("Conversion of Fixed-Bed Reformers to UOP CCR Platforming Technology") in view of Dufresne et al. (Dufresne, US 5,854,162).

The Golem reference discloses a process in which a fixed-bed catalytic reformer unit is revamped so that at least one of the fixed-bed reactors is converted to a moving-bed reactor. All fixed-bed reactors may be converted to moving bed reactors. The moving bed reactor requires catalyst feeding and recovery facilities. A catalyst regenerator is also added to the unit. By performing this revamping, the resulting product from the reactor has improved quality and yield as compared to the product from the fixed-bed unit. The revamped unit is operated at lower pressures (i.e., 100 psi vs. 300 psi or 690 kPa vs. 2068 kPa). The catalyst used in the process contains platinum on a support. The catalyst is believed to be the same as claimed. The revamp in the manner disclosed by Golem is believed to result in a unit that is operated as claimed. See the entire document, especially pages 2, 5, 6, 7, 8, 10, and figure 9.

The Golem reference does not disclose a catalyst regeneration facility that is not integrated with the reactor from which the catalyst is removed.

The Dufresne reference discloses a reforming process in which the catalyst is regenerated offsite. See column 3, lines 31-44 and column 4, lines 16-37.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of the Golem reference by using an offsite regenerator as suggested by Dufresne because this would have allowed for better control of the two principle regeneration steps.

Regarding the pressure conditions, the revamping as disclosed by Golem results in lower pressures used in the process. The actual pressures used would be based on the desired composition of the product and one having ordinary skill in the art would adjust such pressures accordingly.

#### **(10) Response to Argument**

In the argument on page 12/30 (paragraph 2,) the Appellant argues that Golem does not describe or suggest a reformer revamp in which fixed bed reactors are replaced by moving bed reactors without an integrated regenerator.

On page 13/30 (paragraph 4,) the Appellant further argues that

“Golem's hybridizing option also fails to overcome the inherent problems of the fixed bed unit since it retains the fixed bed reactors *as fixed bed reactors*. No attempt is made to obtain to the extent feasible, the advantages of moving bed reactor operation: Golem's hybridizing option keeps the fixed bed reactors with their attendant disadvantages as compared to the presently claimed revamp removes each fixed bed reactor and installs a moving bed reactor. Note the language in claims 1 and 18 specifically requiring each fixed bed reactor to be converted to moving bed operation.”

The Appellant's argument is not persuasive because Golem discloses a reformer revamp in which fixed bed reactors are replaced by moving bed reactors (See page 9, paragraph 3; page 12, paragraph 3 and 4; page 13, paragraph 1 and last paragraph). Golem also discloses the use of an integrated regenerator (See page 8, paragraph 3; page 13, paragraph 4). Golem also cautions that the CCR regenerator will be very expensive (See page 11, last two lines; page 13, bullet 3). Dufresne's invention discloses that conventional reforming regeneration takes place in-situ, on the same site as the refinery (on-site) and encounters problems during the operation, principally due to the lack of flexibility in the regeneration system (See column 1, lines 56-59; column 2, lines 40-43). Dufresne further discloses numerous advantages of off-site regeneration over on-site regeneration (See column 3, lines 30-35; column 4, lines 20-28). Thus, it would have been obvious to one skilled in the art at the time the invention was made to have modified the Golem invention and replace its on-site, highly expensive, regenerator by an off-site regenerator as disclosed by Dufresne for the marked advantages of the later.

In the argument on page 14/30 (last paragraph,) the Appellant argues that since "Golem does not teach the basis revamp or conversion scheme claimed in Applicants' main claims, the rejection is unwarranted by the facts since no notional combination of Golem with Dufresne or any other reference can be adduced as disclosing or suggesting the presently claimed method, at least as claimed in claims 1, 18 and 20. Nothing in Golem suggests a conversion in which all the fixed bed reactors are removed and replaced by a moving bed reactor stack and given this, no combination of other

teachings with Golem can be taken as disclosing or suggesting the presently claimed method in which reactors are replaced but no regenerator provided in the manner contemplated by Golem. What Golem teaches is that if moving bed reactors are provided, they are accompanied by regeneration facilities on a one-on-one basis with the moving bed reactor stack. “

The Appellant's argument is not persuasive because Golem teaches full revamp of fixed bed reactors into a stack of moving bed reactors as discussed before. Due to the advantages of off-site regeneration, evidenced by Dufresne, one skilled in the art would have indeed been motivated to replace Golem's on-site high cost regenerator by an off-site regenerator, also discussed above.

In the argument on page 15/30 (paragraph 1 and 2), the Appellant argues that Dufresne does not suggest offsite regeneration of catalyst from continuous reforming units lacking a regenerator. There is nothing in Golem which indicates the possibility of constructing or operating a continuous reforming unit without at least one fully integrated regenerator. There is nothing in Dufresne which indicates the possibility of operating a continuous reforming unit without its own integrated regenerator. There is no teaching or suggestion in Dufresne, as required by present claims 1 and 18, that "continuous or intermittent catalyst feeding facilities" should be added at the catalyst inlet of the moving bed reactor train and "feeding regenerated catalyst to the catalyst inlet of the first reactor in the train", or for "adding spent catalyst recovery facilities for collecting the spent catalyst from the catalyst outlet of the last moving bed reactor of the series train" in the event that there is "no dedicated continuous regenerator integrated

with the series moving bed reactor train". In other words, Dufresne's teaching is limited to the context and circumstances of fully-integrated continuous reactor-regenerator unit operation.

The Appellant's argument is not persuasive because one skilled in the art would have replaced Golem's onsite regenerator by an off-site regenerator for the reasons discussed earlier. Dufresne teaches, "The aim of the invention is to provide offsite regeneration methods for used catalytic reforming catalysts." (Column 3, lines 31-33). Dufresne further adds, "The process is preferably such that the use catalyst is from a continuous and/or semi-regenerative type reforming process, i.e. a continuous type, semi-regenerative type or mixed type process (Column 4, lines 16-19). Limitations of claims 1 and 18 have been fully addressed in the Office action dated: 09/10/2007.

In the argument on page 16/30 (paragraph 1,) the Appellant argues that Dufresne does not teach the addition of the catalyst handling facilities at the inlet and outlet of the moving bed reactor sequence so as to enable continuous reactor operation to be achieved.

The Appellant's argument is not persuasive because Dufresne teaches the catalyst handling facilities for a continuous reactor operation (See column 3, lines 36-66; column 4, lines 1-44).

In the argument on page 18/30 (paragraph 1), the Appellant argues that the fact that UOP recognized the problem but was unable to come up with a solution that embodied the advantages of moving bed reactor operation without the huge cost of the



moving bed regenerator, must surely be taken as evidence that the technical solution to the economic problem was not obvious to the highly skilled people in this art and that the problem persisted until the present invention was made.

The Appellant's argument is not persuasive because UOP's teaching (Golem reference) combined with Dufresne invention was enough motive for one skilled in the art to come up with a solution: to convert fixed bed reactors to moving bed reactors (Golem) with the on-site regenerator replaced by an off-site regenerator (Dufresne).

In the argument on page 19/30 (last paragraph), the Appellant argues that the fact that Dufresne does not in any way imply or indicate the novel conceptual approach of modifying an otherwise conventional fixed bed reforming unit by replacing the fixed bed reactors in the unit by a moving bed reactor stack, omitting a regenerator and installing extra equipment at each end of the reactor stack for handling the catalyst to be sent for regeneration is indication in itself that the Examiner has pieced this invention together by forbidden hindsight bias.

The Appellant's argument is not persuasive because Dufresne reference has been used only to show the advantages of an off-site regenerator over an on-site regenerator. Every other element of the claim(s), including modifying the fixed bed reactors by a moving bed reactor stack, and installing extra equipment at each end of the reactor stack for catalyst handling is disclosed by Golem (See figures 10 and 11; page 12, Case 2; page 13, bullets 1-5, Case 3; page 14, paragraph 1).

In the argument on page 20/30 (paragraph 1 and 2), with respect to claims 1, 18, 20 and 8, 11, 12, and 19, the Appellant argues that the prior art fails to suggest the required step of operation at lower pressure without an integrated regenerator.

The Appellant's argument is not persuasive because Golem discloses significant pressure reduction in the full CCR Platforming conversions (See page 9, paragraph 2; page 12, paragraph 4; page 13, last paragraph). Dufresne regenerates the deactivated catalyst away from the reforming site (See column 4, lines 32-37), and therefore, does not affect the low pressure employed in the CCR process.

In the argument on page 21/30 (paragraph 1, 2, 3) with reference to claims 4 and 20, the Appellant argues that the prior art does not suggest the use of a shared regenerator. The Appellant further argues that the Examiner has argued on this point (rejection, page 7) that if Dufresne's offsite regenerator is processing catalysts from different processes, (Dufresne, col. 4, lines 16-19), it is "definitely a shared-regenerator". A "shared regenerator" yes, but not shared by two units one of which lacks its own integrated regenerator. It takes a conceptual leap to go from Dufresne's regenerator being shared by "a continuous and/or semi-regenerative type reforming process, i.e. a continuous type, semi-regenerative type of mixed type process" with its connotation of the processes being conventional in type with - in the case of the continuous processes - fully integrated regenerators to a method in which the

regenerator is totally eliminated for one of the units which are to be shared. Dufresne exists only in the context of the conventional type units.

The Appellant's argument is not persuasive because Dufresne's off-site regenerator is processing catalysts from different units which does not exclude the claimed units with or without regenerators (See column 4, lines 16-19, 32-37).

In the argument on page 22/30 (paragraph 1 and 2), the Appellant argues that the examiner's arguments in favor of obviousness are based on the improper premise that the invention is obvious from the beginning. The Appellant further argues that the prior art does not in and of itself disclose or suggest that the claimed conversion in which a regenerator is omitted from a moving bed reactor stack could be made: all the schemes contemplated by Golem include a regenerator in a one-on-one relationship with the reactor stack and Dufresne operates also within this same realm. For this reason, it is improper to conclude that the claimed modification is obvious because it starts from an obvious combination of known teachings (in other words, that it is obvious because it is obvious).

The Appellant's argument is not persuasive because Golem discloses conversion of fixed bed reformers to a stack of moving bed reformers, as discussed earlier, similar to the Appellant's claim. The only difference in Golem invention is that it has integrated on-site regenerator. Dufresne invention discloses the advantages of an off-site regenerator over an on-site regenerator.

In conclusion, the combined teachings of Golem and Dufresne render the claimed invention obvious.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Prem C. Singh

/P. C. S./

Examiner, Art Unit 1797

/ Glenn Caldarola/

Glenn Caldarola

SPE 1797

/Kathryn L Gorgos/

Kathryn Gorgos

Appeals Specialist